

AMENDMENTS TO THE DRAWINGS

The attached "Replacement Sheet" of drawings includes changes to Figure 3.

The attached "Replacement Sheet," which includes Figures 2 and 3, replaces the original sheet including Figures 2 and 3.

Attachment: Replacement Sheet

REMARKS

Claims 1-24 are now pending in the application. Minor amendments have been made to the specification and claims to simply overcome the objections to the specification and rejections of the claims under 35 U.S.C. § 112. The amendments to the claims contained herein are of equivalent scope as originally filed and, thus, are not narrowing amendments. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

Applicant's representatives thank the Examiner for the courtesies extended during the telephone interview of April 17, 2006. The King et al. (U.S. Pat. No. 6,445,927) reference was discussed. While an agreement was not reached, the Examiner acknowledged that King et al. does not teach or suggest a measurement device for measuring a receiving time (TR), based on a reference time, of a predetermined event of the second signals.

DRAWINGS

The drawings stand objected to for certain informalities. Applicant has attached revised drawings for the Examiner's approval. In the "Replacement Sheet," Figure 3 is designated by the legend "Prior Art."

SPECIFICATION

The specification stands objected to for certain informalities. Applicant has amended the specification according to the Examiner's suggestions. Therefore, reconsideration and withdrawal of this objection are respectfully requested.

CLAIM OBJECTIONS

Claims 13 and 14 stand objected to for certain informalities. Applicant has amended claims 13 and 14 according to the Examiner's suggestions to replace "base" with "based". Therefore, reconsideration and withdrawal of the objections are respectfully requested.

REJECTION UNDER 35 U.S.C. § 112

Claims 13 and 14 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed.

Applicant maintains that claims 13 and 14, which as originally filed recite that the position terminal calculates $TT + TR - |P-Q|/c$, apprise a person of ordinary skill in the art of its scope. However, to expedite prosecution, Applicant has amended claims 13 and 14 to recite that the positioning terminal comprises a calculation device for calculating $TT+TR-|P-Q|/c$. Therefore, reconsideration and withdrawal of the rejections are respectfully requested.

REJECTION UNDER 35 U.S.C. § 102

Claims 1-6, 8-11, 13-17, and 19-22 stand rejected under 35 U.S.C. § 102(b) as being anticipated by King et al. (U.S. Pat. No. 6,445,927). This rejection is respectfully traversed.

Claim 1 recites a positioning system for determining a position of a positioning terminal, the system including a plurality of first signal sources each emitting a respective first signal, and one or more second signal sources each emitting a respective second signal, the first signals being synchronous with a reference time and the second signals being non-synchronous with the first signals. The positioning system comprises a measurement device and a control device. The measurement device receives the first signals from the first signal sources to determine a position P of the measurement device and a time of measurement when the measurement device receives the first signals. Based on the time of measurement, the measurement device measures a receiving time (TR), based on the reference time, of a predetermined event of the second signals. The control device determines a signal propagation time (t) between the measurement device and one of the second signal sources by calculating a relative distance $|P-Q|$ between the measurement device and the one second signal source based on the position P measured by the measurement device and a position Q of the one second signal source and by dividing the resulting distance by the signal propagation speed, and determining a time (TT), based on the reference time, at which the one second signal source originates the predetermined event by solving $TR-t$. The positioning terminal uses the time TT as a reference to receive the signals from the first signal sources for positioning. As discussed with the Examiner during the telephone

interview of April 19, 2006, King et al. fails to teach or suggest the positioning system recited by claim 1.

In King et. al., a time bias offset of a signal from a base station is calculated. King et al. Col. 4, Lines 18-29. The calculated time bias offset, however, represents a perceived time as affected by spatial error from multipath in addition to fixed error induced by cable delays, internal base station harnessing, software processing, clock source distribution, and other factors. King et al., Col. 8, Lines 5-23. The calculated time bias offset is not made with reference to a reference time of the GPS signals. In other words, the King et al. time bias offset does not teach or suggest measuring a receiving time (TR), based on the reference time, of a predetermined event of the second signals.

For these reasons, King et al. does not teach each and every element of claim 1. Therefore, claim 1 defines over the King et al. reference and reconsideration and withdrawal of the rejection are respectfully requested. Further, Applicant notes that similar limitations are recited by claims 2, 13, and 14. For at least the above reasons, claims 2, 13, and 14 also define over the King et al. reference and reconsideration and withdrawal of the rejections are respectfully requested.

With regard to claims 3-6, 8-11, 15-17, and 19-22, Applicant notes that each either directly or indirectly depends from claims 1, 2, 13, and 14, which define over the King et al. reference as discussed in detail above. Therefore, claims 3-6, 8-11, 15-17, and 19-22 also define over the King et al. reference and reconsideration and withdrawal of the rejections are respectfully requested.

Claims 1-6, 8-11, 13-16, 18-21, and 23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Krasner et al. (U.S. Pat. No. 6,665,541). This rejection is respectfully traversed.

With regard to claim 1, as noted above, a positioning system is recited that comprises a measurement device for measuring a receiving time (TR), based on the reference time, of a predetermined event of the second signals. The positioning system also recites a control device for determining a signal propagation time (t) between the measurement device and one of the second signal sources. The control device also determines a time (TT), also based on the reference time, at which a second signal source originates the predetermined event by solving TR-t. The positioning terminal uses the time TT as a reference to receive the signals from the first signal sources for positioning.

Krasner et al. fails to teach or suggest calculating a time TT, based on the reference time, and using the time TT as a reference for receiving the signals from the first signal sources for positioning.

In Krasner et al., base stations use time tags or markers in their signals that are transmitted to mobile systems. Krasner et al. Col. 7, Lines 40-42. The tags are used to update the current time at the base station from the GPS time. Krasner et al. Col. 8, Lines 28-31. The base station time, however, is not used for positioning of the mobile systems. Rather, in Krasner the base stations are synchronized based upon timing information sent between each of the base stations. Krasner et al. Col. 5, Lines 55-60.

In the positioning system recited by claim 1, however, the positioning terminal uses the time TT as a reference to receive the signals from the first signal sources for positioning, the first signal sources being synchronized with a reference time.

For these reasons, Krasner et al. does not teach each and every element of claim 1. Therefore, claim 1 defines over the Krasner et al. reference and reconsideration and withdrawal of the rejection are respectfully requested. Further, Applicant notes that similar limitations are recited by claims 2, 13, and 14. For at least the above reasons, claims 2, 13, and 14 also define over the Krasner et al. reference and reconsideration and withdrawal of the rejections are respectfully requested.

With regard to claims 3-6, 8-11, 15-16, 18-21, and 23, Applicant notes that each either directly or indirectly depends from claims 1, 2, 13, and 14, which define over the Krasner et al. reference as discussed in detail above. Therefore, claims 3-6, 8-11, 15-16, 18-21, and 23 also define over the Krasner et al. reference and reconsideration and withdrawal of the rejections are respectfully requested.

Claims 1-6, 8-11, 13-16, and 19-21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Soliman (U.S. Pat. No. 6,433,739). This rejection is respectfully traversed.

With regard to claim 1, as noted above, a positioning system is recited that comprises a measurement device for measuring a receiving time (TR), based on the reference time, of a predetermined event of the second signals. The positioning system also recites a control device for determining a signal propagation time (t) between the measurement device and one of the second signal sources. The control device also determines a time (TT), also based on the reference time, at which a second signal

source originates the predetermined event by solving TR-t. The positioning terminal uses the time TT as a reference to receive the signals from the first signal sources for positioning.

Soliman fails to teach or suggest calculating a time TT, based on the reference time, and using the time TT as a reference to receiving the signals from the first signal sources for positioning.

In Soliman, base stations are configured with GPS receivers. Soliman, Col. 20, Lines 17-21. An internal base station offset delay is measured when the base station is commissioned or at regular intervals. Soliman Co. 21, Lines 14-20.

As supported by the specification, the positioning system of claim 1 teaches away from the use of GPS receivers at the base station. Specification, paragraph 9. The objects of the present invention include providing time to the positioning target without installing a location measurement unit in each base station. Specification, paragraph 9 and 10.

Further, in Soliman the offset delay is measured using a remote synchronizing station located a known distance away from the base station. Col. 21, Lines 25-31. In the positioning system of claim 1, a measurement device, which receives signals from the first signal sources to determine a position of the measurement device, also measures a receiving time (TR), based on the reference time, of a predetermined event of the second signals. In other words, the measuring is done at the positioning terminal not at a remote synchronizing station a known distance away from the base station.

For these reasons, Soliman does not teach each and every element of claim 1. Therefore, claim 1 defines over the Soliman reference and reconsideration and

withdrawal of the rejection are respectfully requested. Further, Applicant notes that similar limitations are recited by claims 2, 13, and 14. For at least the above reasons, claims 2, 13, and 14 also define over the Solimon reference and reconsideration and withdrawal of the rejections are respectfully requested.

With regard to claims 3-6, 8-11, 13-16, and 19-21, Applicant notes that each either directly or indirectly depends from claims 1, 2, 13, and 14, which define over the Solimon reference as discussed in detail above. Therefore, claims 3-6, 8-11, 13-16, and 19-21 also define over the Solimon reference and reconsideration and withdrawal of the rejections are respectfully requested.

Claims 1-6, 8-11, 13-16, and 19-21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Nir et al. (U.S. Pat. No. 6,285,316). This rejection is respectfully traversed.

With regard to claim 1, as noted above, a positioning system is recited that comprises a measurement device for measuring a receiving time (TR), based on the reference time, of a predetermined event of the second signals. The positioning system also recites a control device for determining a signal propagation time (t) between the measurement device and one of the second signal sources. The control device also determines a time (TT), also based on the reference time, at which a second signal source originates the predetermined event by solving TR-t. The positioning terminal uses the time TT as a reference to receive the signals from the first signal sources for positioning.

Nir et al. fails to teach or suggest calculating a time TT, based on the reference time, and using the time TT as a reference to receiving the signals from the first signal sources for positioning.

In Nir, base stations communicate with reference units to determine time offsets between base stations. Nir et al., Col. 7, Lines 32-45. Each reference unit includes a GPS based time reference module. Nir et al., Col. 7, Lines 32-45. Further, the reference units are at fixed and known locations. Nir et al. Col. 9, lines 55-58.

As supported by the specification, the positioning system of claim 1 teaches away from the use of reference units with GPS receivers. Specification, paragraph 9. The objects of the present invention include providing time to the positioning target without installing a location measurement unit in each base station. Specification, paragraph 9 and 10.

In the positioning system of claim 1, a measurement device, which receives signals from the first signal sources to determine a position of the measurement device, also measures a receiving time (TR), based on the reference time, of a predetermined event of the second signals. In other words, the measuring is done at the positioning terminal not at a reference unit a known distance away from the base station.

For these reasons, Nir et al. does not teach each and every element of claim 1. Therefore, claim 1 defines over the Nir et al. reference and reconsideration and withdrawal of the rejection are respectfully requested. Further, Applicant notes that similar limitations are recited by claims 2, 13, and 14. For at least the above reasons, claims 2, 13, and 14 also define over the Nir et al. reference and reconsideration and withdrawal of the rejections are respectfully requested.

With regard to claims 3-6, 8-11, 13-16, and 19-21, Applicant notes that each either directly or indirectly depends from claims 1, 2, 13, and 14, which define over the Nir et al. reference as discussed in detail above. Therefore, claims 3-6, 8-11, 13-16, and 19-21 also define over the Nir reference and reconsideration and withdrawal of the rejections are respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 18 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over King et al. This rejection is respectfully traversed.

As described above, claims 18 and 23 each depend from claims 12 and 14 which define over the King et al. reference discussed in detail above. Therefore, claims 18 and 23 also define over the King et al. reference and reconsideration and withdrawal of the rejections are respectfully requested.

Claims 7, 12, and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over King et al., Krasner et al., Solimon, and Nir et al. in further view of Vannucci (U.S. Pub. No. 2004/0189515). This rejection is respectfully traversed.

As described above, claims 7, 12, and 24 each depend from claims 1 and 13 which define over the King et al., Krasner et al., Solimon, and Nir et al. references discussed in detail above. With regard to claim 1, Vannucci likewise fails to teach or suggest a positioning system that comprises a measurement device for measuring a receiving time (TR), based on the reference time, of a predetermined event of the second signals and a control device for determining a signal propagation time (t) between the measurement device and one of the second signal sources, wherein the

control device determines a time (TT), also based on the reference time, at which a second signal source originates the predetermined event by solving TR-t, and wherein the positioning terminal uses the time TT as a reference to receive the signals from the first signal sources for positioning.

For these reasons, the prior art cited does not teach each and every element of claim 1. Therefore, claim 1 defines over the prior art cited. Further, Applicant notes that claims 7 and 12 depend from claim 1, discussed in detail above. Therefore, claims 7 and 12 also define over the prior art cited and reconsideration and withdrawal of the rejections are respectfully requested.

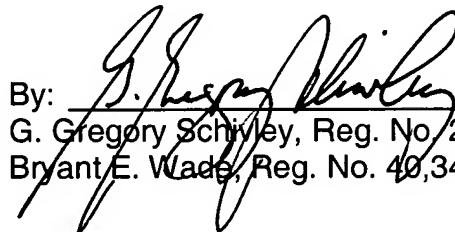
Similar limitations are recited by claim 13. For at least the above reasons, claim 13 also defines over the prior art cited. Applicant notes that claim 24 depends from claims 13, which defines over the prior art as discussed in detail above. Therefore, claim 24 also defines over the prior art cited and reconsideration and withdrawal of the rejections are respectfully requested.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: May 12, 2006

By: 
G. Gregory Schivley, Reg. No. 27,382
Bryant E. Wade, Reg. No. 40,344

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

GGS/BEW/MPD